Imperial Network of Excellence in Sustainability through Life Cycle Approaches

‘Imperial Life Cycle Network’

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Group: ‘Life Cycle Community UK’
Seminar Series

13th October 2020, 17.30-18.30 (GMT)
Dr. Carly Whittaker (UK Department for Transport)
‘Life Cycle Assessment, counterfactuals and policy making’

10th November 2020, 17.30-18.30 (GMT)
Dr. Serenella Sala (European Commission, Joint Research Centre)
‘Life Cycle Assessment in EU policies: past, present and future’

8th December 2020, 17.30-18.30 (GMT)
Dr. Llorenç Milà i Canals (UN Environment Programme, Life Cycle Initiative)
‘UNEP Life Cycle Initiative's work to support progress towards the SDGs with life cycle approaches’

➔ To register please visit: www.imperial.ac.uk/life-cycle-network/events/
Life cycle assessment in EU policies
past, present and future

Serenella Sala
European Commission – Joint Research Centre

10th November 2020,
Imperial College London, virtual seminar
Joint Research Centre – European Commission

As the science and knowledge service of the European Commission, the Joint Research Centre's mission is to support EU policies with independent evidence throughout the whole policy cycle.

As a Commission service independent from national or corporate interests, the JRC builds trust by providing evidence to support the definition of policies - from their design to implementation, monitoring and evaluation.
Joint Research Centre – European Commission

Established in 1957

Around 3000 Staff

10 Directorates

>1000 Publications per year

6 Locations in 5 Member States

42 Large scale facilities
The Joint Research Centre (JRC) is the European Commission's science and knowledge service which employs scientists to carry out research in order to provide independent scientific advice and support to EU policy.
Sustainable Resources Directorate - Policy Context

10 Priorities

Living well, within the limits of our planet
7th Environment Action Programme

Sustainable Resources Directorate

The EU's common agricultural policy

A Bioeconomy Strategy for Europe

The EU Biodiversity Strategy to 2020

Circular Economy package

BLUE GROWTH
21% in WATER

Copernicus
The European Earth Observation Programme
Contents

• Key role of life cycle thinking in support to policies
• Evolution of the role of LCA in policies, an EU perspective
• Green Deal: zooming into its key components
European Platform on LCA

Supporting EU policies and developing methods and approaches to improve robustness and wide applicability of LCA

https://eplca.jrc.ec.europa.eu/
Life Cycle Thinking

Core concept for Sustainability Assessment of Goods, Services, Organisations and Regions

- Design
- Resource extraction, farming, processing
- Manufacturing, processing
- Transportation
- Retail, use
- Recycling, re-use, energy recovery
- Disposal
How may we manage a transition towards better production and consumption systems, within limits of our planet?

- Integrated assessment
- Avoiding burden shifting along supply chains
  - Life cycle stages
  - Impact categories
  - Geographical boundaries
  - Temporally
LCT and LCA supporting integrated assessment - 1

- Assess the performance of good, services, systems, technologies, innovations, infrastructures, waste management options, regions

- Help identifying the most important burdens and the most relevant life cycle stages contributing to environmental impacts (material extraction, manufacturing, use phase etc.)
Avoiding burden shifting

• *over impact categories* (increasing impact in an impact category while reducing the impact on another) and…

• *over life cycles stages* (e.g. increasing impact in the end of life while reducing the impact in the use phase)
LCT and LCA supporting integrated assessment - 3

- covering the **entire supply chain**, either European and extra European

- Allowing **assessing options along the life cycle**, having policy implications. E.g. improvement of recovery/recycling of precious / critical raw materials at the end-of-life can reduce the dependence of EU on imports'
Ensure consistency and a **systematic approach** in the evaluation of impacts.
LCT and LCA supporting integrated assessment - 5

Supporting the assessment of the relationship between micro and macro scale (e.g. product and territorial policies)

Micro scale
- Product policies
  - Policies related to the product, e.g. limits on emission of CO₂
- Industrial policies
  - Policies of emission reduction in the production plants
- Structure of the economy
  - Presence of production plants in EU of intra EU (e.g. sectors that are decentralised)

Macro scale
- Current environmental status
  - E.g. local concentration of pollutants due to other drivers/pressures
- Infrastructure availability and quality
  - E.g. railway, public transport, alternatives etc
- Citizens' choice
  - Quantity and quality
    - Choice of a car model (e.g. SUV vs. city car)
- Citizens' behaviour
  - Quantity and quality
    - Frequency of car’s usage, driving style

Product level
- Emissions from one car, product policies

Meso level
- Mobility system, infrastructure

Macro level
- Air quality – territorial policies
Run **scenarios under specific assumptions** in terms of production and consumption patterns to estimate impacts associated with possible future interventions and consumers choices and behaviours.

**Assess options and burdens** and benefits associated to the implementation of policy options (and associated targets), enlightening the decision-making process.
LCT and LCA supporting integrated assessment for Sustainable Development Goals

Several impacts are covered by the LCA impact categories (some examples, in purple covered by environmental LCA, in green by Social LCA)

- Impact related to human toxicity
- Nutrient cycle and related impacts
- Ecotoxicity
- Energy consumption and emission of CO2 along supply chains
- Land footprint
- Water footprint
LCT and LCA supporting integrated assessment for Sustainable Development Goals

LCT and LCA supporting integrated assessment beyond relative assessment

- Linking LCA impact categories with planetary boundaries

Life Cycle Thinking and assessment in the policy cycle

Policy Anticipation and Problem Definition

Policy Formulation

Policy Impact Assessment

Policy Implementation

Policy Evaluation

Effectiveness of policy

Compliance checks

Comparison of options

Definition of policy options

Identification of emerging issues / prioritisation of intervention

LCA as a pivotal method for policy support
Policy anticipation and problem definition

LCA studies reporting “insight/warnings” related to environmental issues to be taken into account

Examples:

• the problem definition of the impact assessment of the communication Building single market for green product COM(2013)196;
• communication on Resource Efficiency Opportunities in the Building sector COM(2014) 445
Typologies of policy options requiring:

- **assessment** (e.g. REACh, requiring risk assessment of substances for human health and ecosystems; EIA directive, setting a procedure for authorization of certain plants);
- **management scheme** (e.g. SEA directive, assessing and monitoring plans);
- **specific requirements** (e.g. ecodesign directive; ecolabel; air quality directive; emission trading directive).
ROLE OF LCA

- e.g. a full LCA may be request before putting a certain product on the market;
- LCA for monitoring performance of products;
- LCA may be used to set the requirements to be respected.

Policy options may:

- be based on LCT/LCA results (e.g. addressing a specific relevant life cycle stage or relevant environmental impact)
- include some requirements based on LCA indicators (e.g. a life cycle assessment based calculation)
Examples:

• in the *Waste framework directive* (2008/98/EC) where LCT is cited for justifying possible changes in the waste hierarchy, due to environmental concerns assessing waste management options;

• in the communication “*Building single market for green product*” COM(2013)196 where LCA is the reference methodology for product and organisation environmental assessment and in the *green claims initiative of 2020*
Policy impact assessment

- Supporting the **comprehensive and systematic assessment of environmental aspects**, and even beyond environmental aspects if including Life Cycle Costing and Social LCA.
- LCA may **spot impacts** related to a number of different impact categories and may help avoiding shifting burden from one stage in the life cycle to another.
- Complementary to **risk assessment**.
- Assessing **future scenarios**.

**Example:**

- in the impact assessment of **plastic bags directive** (SWD/2013/0444) where policy options has been based on tackling issue coming from a convergence of different LCA which were supporting prevention policy options.
Life cycle analysis is listed in the Better regulation toolbox (tool 64) among the methodology which may support policy impact assessment.


https://ec.europa.eu/info/files/better-regulation-toolbox-64_en
If LC-based indicators are used as requirements of the policy option, LCA studies will be needed.

**Example:**

- **Directive on renewable resources** (2009/28/EC) where there is an LCT based requirement on GHG reduction for Biofuels;
- “**Ecodesign Directive**” (2005, then 2009/125/EC) Definition in Annex I of the (Method for setting generic ecodesign requirements) of the life cycle stages and the environmental aspects that should be tackled by implementing measures.
Policy evaluation

• Use of LCA for assessing the benefit of the policy (at macro scale) including systemic aspects.
• Need of modifying/ repealing a legislation.

Example:

• the **repeal of waste oil directive** based also on a study reporting LCA evidences.
Evolution of LCT/LCA/LCC/PEF in the EU policies

By type

- Sustainable investments (LCT,LCA,PEF)
- Circular Economy Action plan (LCT,LCA,PEF)
- Biodiversity strategy (LCT,LCA,PEF)
- Farm to fork strategy (LCT,LCA,PEF)
- EU Green Deal (LCT,LCA)
- Single market green products (PEF,LCT,LCC)
- Bioeconomy (LCA,PEF)
- Single use plastic (LCT,LCA)
- Public procur. (LCT,LCC)
- Resource energy flagship (LCT,LCA,LCC)
- Waste prevention strategy (LCT,LCA,LCC)
- Ecodesign (All)
- Integrated Product Policy (LCT,LCA)
- EOL Vehicles (LCT)
- Packaging (LCT)
- Ecolabel (LCT,LCA)
- Energy Labelling (LCT,LCC)
- Wastefd (LCT,LCA)
- GPP (LCT,LCC)
- REACH (LCT)
- Biofuel (LCT)
- Better Reg. (LCT)
- Packaging waste (LCT,LCA)
- Sust. Invest. (LCT,PEF)
- Single use plastic (LCT,LCA)
- Single use plastic (LCT,LCA)
- EU Green Deal (LCT,LCA)

Timeline:
- 1993-1994: Ecolabel (amendment) (LCT,PEF), Energy Labelling (LCT,LCC)
- 1995-1996: Waste prevention strategy (LCT,LCA,LCC), Sust. Use resources (LCT)
- 2001-2002: EOL Vehicles (LCT)
- 2003-2004: Packaging (LCT)
- 2005-2006: Ecolabel (LCT,LCA)
- 2007-2008: Wastefd (LCT,LCA), GPP (LCT,LCC)
- 2009-2010: REACH (LCT)
- 2011-2012: Biofuel (LCT)
- 2013-2014: Better Reg. (LCT)
- 2015-2016: Packaging waste (LCT,LCA)
- 2019-2020: EU Green Deal (LCT,LCA)
Evolution of LCT/LCA/LCC/PEF in the EU policies

By type of policy
Types of policies

The figure is excluding specific implementations, such as the 57 Decisions linked to the Ecolabel Regulation and the 24 Regulations linked to the Ecodesign Directive.
Overview of the main sectors addressed in Policies and Communications
LCT in EU policies developments

EU COMMUNICATIONS

• **LCT is at the heart**
  IPP seeks to minimize environmental impacts by looking at all phases of a products' life-cycle and taking action where it is most effective

• **“Building the Single Market for Green Products”** (2013)
  the initiative proposes a set of actions, establishing two methods to measure the environmental performance throughout the life cycle of products and organizations, the PEF and the OEF

• **LCT is also addressed in other COM**, including:
  - “Better regulation” (2015, 2020)
  - “Circular economy” (2015, 2020)
  - “Resource Efficient Europe’ (2011)
  - “Challenges in Commodity Markets and on Raw Materials” (2011)
LCT in EU policies developments

LCT is at the heart

DIRECTIVES

• “Ecodesign Directive” (2005, then 2009)
  Article 1: “It contributes to sustainable development by increasing energy efficiency and the level of protection of the environment”; Definition in Annex I of the Directive (Method for setting generic ecodesign requirements) referring to of the life cycle stages and the environmental aspects that should be tackled by implementing measures

• LCT is also addressed

    introduces the waste hierarchy; possible deviation from the waste hierarchy can be justified through LCT

  • “Energy labelling Directive” (1992 then 2010)
    provide to consumers with information on the energy consumption, and other environmental aspects (e.g. water consumption, noise) during the use phase of the product

  • “Public procurement Directives” (2004 then 2014)
    allow public procurement …..to achieve objectives of sustainability….submitting tenders that reflect the diversity of technical solutions standards and technical specifications including those drawn up on the basis of performance criteria linked to the life cycle (Directives 23, 24, 25 of 2014)
LCT in EU policies developments

**REGULATIONS**

- **LCT is at the heart**
  - “Ecolabel regulation” (2000, then 2010): Ecolabel is a “voluntary (…) award scheme intended to promote products with a reduced environmental impact during their entire life cycle and to provide consumers with (…) information on the environmental impact of products”. Ecolabel criteria are often developed following a thorough LCA analysis to identify hot-spots

- **LCT is also addressed**
  - “REACH Regulation on Chemicals” (2006) Risk assessment and management of chemicals shall consider all stages of the life-cycle of the substance resulting from the manufacture and identified uses;
  - “Construction Products Regulation” (2011) It defines basic requirements for construction works (in terms of health, safety of persons, environmental impacts along the life cycle)
Bioeconomy Strategy

- Assessing benefits and trade-offs of a transition towards a circular bioeconomy at the level of products and systems
- Supporting innovation with prospective LCA of green chemistry solutions at low technological readiness level
- Leverage environmental performance information to boost the market of bio-based products by potentially integrating the Environmental Footprint methods into a wide range of relevant tools

A Clean Planet for All: the 2050 Long-term Strategy that asked for paradigm shifts

Addressing global challenges, spillover, and transboundary effects

Stressing the need of system thinking in policies
All unforeseen challenges have not derailed our efforts to deliver on our long-term agenda for the EU.

I remember our first days in office. At that time there was still a lot of skepticism about the Green Deal and the goal to be climate-neutral in 2050.

Today, it is no longer the question if there will be a Green Deal, but: How far-reaching will the transition be?
UN Agenda 2030 for Sustainable Development

17 Goals
169 Targets
232 Indicators
Sustainability at the core of the six political ambitions of the new Commission

Life cycle thinking especially relevant in three key pillars of the current EU Commission

A Green Deal for Europe
- Pillar dedicated to sustainable production and consumption
- A new Circular Economy Action Plan
- Mobilising research and fostering innovation

A stronger Europe in the World
Secure and sustainable value chains
Fair trade and responsible sourcing

A Europe fit for the Digital Age
- Competitive industry
- Industrial Strategy Package
The EU green deal, LCA and PEF/OEF

European Green Deal
- Life cycle approach
- Environmental footprint of products
- Transboundary effects (consumption perspective)

Relevance of:
- LCA
- PEF/OEF
- Life cycle thinking

Circular Economy Action Plan (CEAP)

- The CEAP is a building block of the **European Green Deal**, Europe's new agenda for sustainable growth.

- With initiatives along the entire life cycle of products, it aims to make our economy competitive and fit for a green future, while protecting the environment and giving new rights to consumers.

- **Sustainable products**. It focuses on the design and production for a circular economy, to ensure that the resources used are kept in the EU economy for as long as possible.

- **Focus areas**: electronics and ICT, batteries, textiles, plastics incl. microplastics, construction and buildings, food and packaging, waste.
CEAP and LCA

Circular economy

- Harmonisation of product policies
- Green claims based on Product Environmental Footprint
- Improving efficiency of nutrients flows with a system perspective
- Improving waste collection and management systems as well as use of secondary raw materials
- Analysis of supply chains of key sectors: appliances, textile, plastics etc
- Consumer behaviors towards a green transition
Raw materials information System

https://rmis.jrc.ec.europa.eu/
Single Market for Green Products Initiative

A company wishing to market its product as environmentally friendly in several Member State markets faces a confusing range of choices of methods and initiatives. Sometimes they have to use different ones for different markets. This results in costs for companies and confusion for consumers.

The European Commission proposed the Product Environmental Footprint and Organisation Environmental Footprint methods as a common way of measuring environmental performance.

The approach was tested between 2013-2018 together with more than 280 volunteering companies and organisations. The results and reports of the pilot phase are available.

Based on the results of the testing, the European Commission is now exploring

https://ec.europa.eu/environment/eussd/smgp/index.htm
The PEF/OEF methods have been developed since 2013 within the Single Market for Green Products Initiative.

The aim is to provide companies with standard methods to substantiate claims they make about the environmental footprint of their products / services.

Based on ISO 14040 series standards, PEF/OEF further specify key methodological options and quality requirements for data (and potentially including sectorial rules, named Product Environmental Footprint Category Rule PEFCR/ Organisation Environmental Footprint Sectorial Rules OEFSR).

Methods developed through consensus building and industry driven (for the development of PEFCR/OEFSR).

The overall objective is to grant a level playing field for environmental claims.
Green claims initiative

Initiative on substantiating green claims

Today it is difficult for consumers, companies and other market actors to make sense of the many environmental labels and initiatives on the environmental performance of products and companies. There are more than 200 environmental labels active in the EU, and more than 450 active worldwide; there are more than 80 widely used reporting initiatives and methods for carbon emissions only. Some of these methods and initiatives are reliable, some not; they are variable in the issues they cover.

Another issue is greenwashing – companies giving a false impression of their environmental impact or benefits. Greenwashing misleads market actors and does not give due advantage to those companies that are making the effort to green their products and activities. It ultimately leads to a less green economy.

To tackle this issue, the European Green Deal states “Companies making 'green claims' should substantiate these against a standard methodology to assess their impact on the environment”.

https://ec.europa.eu/environment/eussd/smgp/initiative_on_green_claims.htm
“Farm to Fork” Strategy and CAP beyond 2020

• Adopting a system perspective
• Reducing the overall environmental footprint of the EU food system
• Supporting sustainability labelling of food products
Biodiversity Strategy 2030

Towards reverted biodiversity loss & healthy ecosystems
- Biodiversity and Healthy Ecosystems
- Natural Capital Accounting and Monitoring Indicators
- Soils as key component across many policies
- Safeguarding European wild pollinators
- Monitoring alien invasive species to protect nature

Biodiversity footprint
measuring the environmental footprint of products and organisations on the environment, including through life-cycle approaches and natural capital accounting

Role of footprints

Deforestation footprint

Forestry
- Advanced monitoring of global forest resources
- Monitoring EU forest status & threats for adaptation
The way forward…

- Complementarity with other methodologies
- Coherence and consistency in the use of LCA in different product policies (e.g. PEF, Ecolabel, Ecodesign, GPP)
- Coherence, consistency, synergies and win-win between policies dedicated to single elements and those looking at the entire supply chain (e.g. Reach, Waste Policies, etc)
- Supporting Sustainable Development Goals’s
- Interpretation of results
- Communication of results
Conclusion

• The European Commission has put the delivery of the 2030 Agenda and its SDGs on top of its political agenda for Green Deal, shaping a sustainable Europe for future generations and striving for competitive sustainability.

• To fully implement SDGs across geographical and policy areas, a multi- and interdisciplinary approach is needed with solid evidence base.

• Integrated modelling is key to identify synergies and unveil trade-offs among SDGs, to anticipate direct and indirect effects, to assess sustainability of policies and define solutions to reach the SDG targets.

• Life cycle thinking and assessment are present into EU policies since the early 90’s. Policies evolved over time and now life cycle thinking and assessment are central in the Green Deal as approaches to deliver on the ambitious targets.

• Improving the link between product and territorial policies is an essential step towards more effective environmental policies.
References


Thank you

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Thank you all for your attention and participation!

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